Math 2   Name: *Key*

Unit 6 Day 3 Notes – Mutually Exclusive & Inclusive Events   Date:_____

Suppose you are rolling a six-sided die. What is the probability that you roll an odd number or you roll a 2? ①, ②, ③, ④, ⑤, ⑥ $\frac{3}{6} + \frac{1}{6}$

1. Can these both occur at the same time? Why or why not?

No; 2 is an Even #, not an Odd #

Mutually Exclusive Events	*Multiple events that do not overlap*
Addition Formula	$P(A \text{ or } B) = P(A) + P(B)$

Example: If you randomly chose one of the integers 1 – 10, what is the probability of choosing either an odd number or an even number? ①, ②, ③, ④, ⑤, ⑥, ⑦, ⑧, ⑨, ⑩

2. Are these mutually exclusive events? Why or why not?

Yes; an odd # can't be an even # and vice versa

3. P(odd) $= \frac{5}{10} = \frac{1}{2}$

4. P(even) $= \frac{5}{10} = \frac{1}{2}$

5. P(odd & even) $= \frac{1}{2} \cdot \frac{1}{2} = \frac{1}{4}$

6. Calculate P(odd or even) using the formula $= \frac{1}{2} + \frac{1}{2} = \frac{2}{2} = 1$

7. Does this answer make sense? *Yes; half of the 10 #'s are even and half odd*

Examples: Two fair dice are rolled. What is the probability of getting a sum less than 7 or a sum equal to 10?

8. Are these events mutually exclusive? Why or why not?

Yes; a sum of 10 and a sum less than 7 have none in common

9. Complete the following table using the sums of two dice. ✓

10. P(getting a sum less than 7 OR sum of 10)

$\frac{15}{36} + \frac{3}{36} = \frac{18}{36} = \frac{1}{2}$

11. What does this mean?

Those two events make up half the chart.

Sum	1	2	3	4	5	6
1	2	3	4	5	6	7
2	3	4	5	6	7	8
3	4	5	6	7	8	9
4	5	6	7	8	9	10
5	6	7	8	9	10	11
6	7	8	9	10	11	12

Suppose you are rolling a six-sided die. What is the probability that you roll an odd number or a number less than 4? odd # = {1, 3, 5}   Less than 4 = {1, 2, 3}

    12. Can these both occur at the same time? Why or why not?

        Yes; 1 + 3 are odd and less than 4

Mutually Inclusive Events	two events that do overlap
Addition Formula (Modified)	$P(A \text{ or } B) = P(A) + P(B) - \underline{P(A \cap B)}$, overlap

Examples:

13. What is the probability of choosing a card from a deck of cards that is a club or a ten?

    P(choosing a club or a ten)   Club   Ten   Ten + Club

$$\frac{13}{52} + \frac{4}{52} - \frac{1}{52} = \frac{16}{52} = \frac{4}{13}$$

14. What is the probability of choosing a number from 1 to 10 that is less than 5 or odd?

    1, 2, 3, 4, 5, 6, 7, 8, 9, 10

$$\frac{4}{10} + \frac{5}{10} - \frac{2}{10} = \frac{7}{10}$$

    less than 5 = {1, 2, 3, 4}   odd = {1, 3, 5, 7, 9}

15. A bag contains 26 tiles with a letter on each, one tile for each letter of the alphabet. What is the probability of reaching into the bag and randomly choosing a tile with one of the first 10 letters of the alphabet on it or randomly choosing a tile with a vowel on it?

    A B C D E F G H I J

$$\frac{10}{26} + \frac{5}{26} - \frac{3}{26} = \frac{12}{26} = \frac{6}{13}$$

    A E I O U

16. A bag contains 26 tiles with a letter on each, one tile for each letter of the alphabet. What is the probability of reaching into the bag and randomly choosing a tile with one of the last 5 letters of the alphabet on it or randomly choosing a tile with a vowel on it?

    V W X Y Z

$$\frac{5}{26} + \frac{5}{26} = \frac{10}{26} = \frac{5}{13}$$

    A E I O U

On Your Own

Given the situation of drawing a card from a standard deck of cards, calculate the probability of the following:

1. Drawing a red card or a king
2. Drawing a ten or a spade
3. Drawing a four or a queen

4. In a math class of 32 students, 18 boys and 14 are girls. On a unit test, 5 boys and 7 girls made an A grade. If a student is chosen at random from the class, what is the probability of choosing a girl or an A student?